

WHAT IS CLAIMED IS:

1 1. A method for modifying the glycosylation pattern of a glycopeptide
2 comprising an acceptor moiety for a first fucosyltransferase, said method comprising:
3 contacting the glycopeptide with a reaction mixture that comprises a fucose
4 donor moiety and the first fucosyltransferase under appropriate conditions to transfer fucose
5 from the fucose donor moiety to the acceptor moiety, such that the glycopeptide has a
6 substantially uniform fucosylation pattern.

1 2. The method according to claim 1, wherein the glycopeptide comprises
2 a second acceptor moiety for a second fucosyltransferase, and the method further comprises
3 contacting the glycopeptide with a reaction mixture that comprises a fucose donor moiety and
4 the second fucosyltransferase under appropriate conditions to transfer fucose from the fucose
5 donor moiety to the acceptor moiety, such that the glycopeptide has a substantially uniform
6 fucosylation pattern.

1 3. The method according to claim 2, wherein the glycoprotein is
2 contacted with the first fucosyltransferase and the second fucosyltransferase simultaneously.

1 4. The method according to claim 2, wherein the glycoprotein is
2 contacted with the first fucosyltransferase and the second fucosyltransferase sequentially
3 without isolation of product resulting from contacting with the first fucosyltransferase.

1 5. The method according to claim 1, wherein the first fucosyltransferase
2 is a member selected from FucT-IV, FucT-VI, FucT-VII and combinations thereof.

1 6. The method according to claim 2, wherein the second
2 fucosyltransferase is a member selected from FucT-IV, FucT-VI, FucT-VII and combinations
3 thereof.

1 7. The method of claim 1, wherein the fucosyltransferase is bacterial.

1 8. The method of claim 1, wherein the fucosyltransferase is
2 recombinantly produced.

3 moiety other than a fucose donor moiety, thereby glycosylating the glycoprotein with a
4 glycosyl moiety other than a fucose unit.

1 **21.** The method of claim 20, wherein the glycosyltransferase is a member
2 selected from the group consisting of galactosyltransferase, sialyltransferase and
3 combinations thereof.

1 **22.** A composition comprising a glycopeptide fucosylated according to the
2 method of claim 1.

1 **23.** The composition of claim 22, wherein at least 80% of the acceptor
2 moieties on the glycopeptide are fucosylated.

1 **24.** The composition of claim 22, wherein glycopeptide is attached to a
2 solid support.

1 **25.** The composition of claim 24, wherein the solid support is an affinity
2 chromatography medium.

1 **26.** The composition of claim 22, wherein the glycopeptide is a full-length
2 glycopeptide.

1 **27.** The composition of claim 22, wherein the glycopeptide comprises
2 $\text{Fu}\alpha 1,2\text{Gal}\beta 1\text{-OR}$, $\text{Gal}\beta 1,3/4(\text{Fu}\alpha 1,4/3)\text{GlcNAc-OR}$,
3 $\text{NeuAc}\alpha 2,3\text{Gal}\beta 1,3/4(\text{Fu}\alpha 1,3/4)\text{GlcNAc-OR}$, $\text{Fu}\alpha 1,2\text{Gal}\beta 1,3/4(\text{Fu}\alpha 1,4/3)\text{GlcNAc}\beta\text{-OR}$
4 wherein R is an amino acid, a saccharide, an oligosaccharide or an aglycon group having at
5 least one carbon atom and is linked to or is part of a glycopeptide.

1 **28.** The, composition of claim 22, wherein the glycopeptide comprises
2 $\text{NeuAc}\alpha 2,3\text{Gal}\beta 1,3/4(\text{Fu}\alpha 1,3/4)\text{GlcNAc-OR}$, wherein R is an amino acid, a saccharide, an
3 oligosaccharide or an aglycon group having at least one carbon atom and is linked to or is
4 part of a glycopeptide.

1 **29.** The composition of claim 22, wherein the glycopeptide is a hormone, a
2 growth factor, an enzyme, an enzyme inhibitor, a cytokine, a receptor, a ligand, or a
3 monoclonal antibody.

1 **30.** The composition of claim 22, wherein the glycopeptide is on a cell.

1 **31.** A method of producing a recombinant glycopeptide having a
2 fucosylation pattern that is substantially identical to a fucosylated glycopeptide having a
3 known fucosylation pattern, said method comprising:

- 4 (a) contacting the recombinant glycopeptide with a reaction mixture that comprises a
5 fucose donor moiety and the fucosyltransferase under appropriate conditions
6 to transfer fucose from the fucose donor moiety to a fucose acceptor moiety on
7 said recombinant glycopeptide, thereby producing a fucosylated recombinant
8 glycopeptide; and
9 (b) terminating the transfer of the fucose to the fucose acceptor when the fucosylation
10 pattern substantially identical to the known fucosylation pattern is obtained.

1 **32.** The method according to claim 31 further comprising:
2 (c) assaying the fucosylation pattern of the fucosylated recombinant glycopeptide,
3 thereby determining whether the fucosylation pattern is substantially identical
4 to the known fucosylation pattern.

1 **33.** The method according to claim 31 wherein the terminating is due to
2 exhausting in the reaction mixture a member selected from the group consisting of the
3 fucosyltransferase, the fucose donor moiety, the fucose acceptor quench with a chelator and
4 combinations thereof.

1 **34.** The method according to claim 31, wherein the glycopeptide
2 comprises a second acceptor moiety for a second fucosyltransferase, and the method further
3 comprises contacting the glycopeptide with a reaction mixture that comprises a fucose donor
4 moiety and the second fucosyltransferase under appropriate conditions to transfer fucose
5 from the fucose donor moiety to the second acceptor moiety.

1 **35.** The method according to claim 34, wherein the glycoprotein is
2 contacted with the first fucosyltransferase and the second fucosyltransferase simultaneously.

1 **36.** The method according to claim 34, wherein the glycoprotein is
2 contacted with the first fucosyltransferase and the second fucosyltransferase sequentially
3 without isolation of product resulting from contacting with the first fucosyltransferase.

